

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO



**SAULT
COLLEGE**

COURSE OUTLINE

COURSE TITLE: SOIL MECHANICS

CODE NO. : ARC217 **SEMESTER:** FOUR

PROGRAM: CIVIL ENGINEERING TECHNICIAN

AUTHOR: *Subhash Verma P. Eng.*

DATE: January 2011 **PREVIOUS OUTLINE DATED:** Jan 2010

APPROVED:

“Corey Meunier”
CHAIR

TOTAL CREDITS: FOUR

PREREQUISITE(S): NIL

LENGTH OF COURSE: 16 WEEKS **TOTAL CREDIT HOURS:** 64

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***For additional information, please contact Corey Meunier, Chair
School of Technology & Skilled Trades
(705) 759-2554, Ext. 2610***

I. COURSE DESCRIPTION:

This is an introductory soil mechanics course. Topics covered include: rock/soil origins, landform analysis, soil identification and classification system, site investigation, laboratory testing, movement of water through soils and compaction control.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

Upon successful completion of this course, the student will demonstrate the ability to:

1. *Identify soil types, origins and properties.*

Potential Elements of the Performance:

- Outline the geological and weathering processes that resulted in rock formations and soil deposits.
- Describe the characteristics of common soil deposits in Ontario.
- Review soil and geological maps for probable site conditions.

2. *Solve applied problems in soils mechanics*

Potential Elements of the Performance:

- Calculate mass/volume relationships for given units of soil.
- Solve compaction problems

3. *Use the Unified Classification System and assess the capabilities and limitations of soil groups in engineering applications.***4. *Conduct laboratory tests***

Potential Elements of the Performance:

- Perform a mass-volume relationship test.
- Perform a sieve analysis.
- Perform a hydrometer analysis.
- Perform an Atterberg Limits test.
- Perform a constant head permeability test.

5. *Describe the manner in which water moves through soils such as permeability and capillary action and the effect that water movement has on drainage and frost heave.*

Potential Elements of the Performance:

- Describe the process of water movement through soil particles.
- Outline and illustrate the types of water found in soils
- Explain the mechanics of capillarity.
- Solve permeability problems using Darcy's law of flow.
- Construct simple flow nets for various soil-water conditions.
- Explain and illustrate dewatering systems for construction sites.
- Explain the mechanics of frost heave.

6. *Research, schedule and execute a procedure for performing a field investigation.*

Potential Elements of the Performance:

- Describe what information should be sought in a preliminary soil reconnaissance investigation.
- Outline the equipment and techniques used in soil sampling and testing in the field.
- Describe methods used to identify location of water table.
- Prepare site plans showing borehole locations.
- Document borehole logs.
- Draw profiles from given borehole logs.

III. TOPICS:

1. Rock/Soil Origins
2. Soil Mechanics Problems
3. Soil Classification Systems
4. Laboratory Testing of Soils
5. Movement of Water Through Soils
6. Site Investigation

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

Essential of Soil Mechanics and Foundations, 7th edition

David F. McCarthy

V. EVALUATION PROCESS/GRADING SYSTEM:

You will be assigned a final grade on successful completion of laboratories assignments, and tests, weighted as follows:

Lab work and reports	25%
Tests	55%
Quiz & assignments	20%
TOTAL	100%

Late lab reports submittals receive only a maximum grade of 50%. However, laboratories or assignments handed in later than one week will receive a grade of 0%.

An average of 50% on laboratories/assignments and 60% on tests is required for successful completion of this course.

The following semester grades will be assigned to students:

Grade	<u>Definition</u>	<i>Grade point Equivalent</i>
A+	90 – 100%	4.00
A	80 – 89%	3.00
B	70 - 79%	2.00
C	60 - 69%	1.00
D	50 – 59%	0.00
F (Fail)	<50%	
CR (Credit)	Credit for diploma requirements has been awarded.	
S	Satisfactory achievement in field /clinical placement or non-graded subject area.	
U	Unsatisfactory achievement in field/clinical placement or non-graded subject area.	
X	A temporary grade limited to situations with extenuating circumstances giving a student additional time to complete the requirements for a course.	
NR	Grade not reported to Registrar's office.	
W	Student has withdrawn from the course without academic penalty.	

VI SPECIAL NOTES:**Attendance:**

Sault College is committed to student success. There is a direct correlation between academic performance and class attendance; therefore, for the benefit of all its constituents, all students are encouraged to attend all of their scheduled learning and evaluation sessions. This implies arriving on time and remaining for the duration of the scheduled session. It is the departmental policy that once the classroom door has enclosed, the learning process has begun. Late arrives will not be granted admission to the room.

VII. COURSE OUTLINE ADDENDUM:

The provisions contained in the addendum located on the portal form part of this course outline.